

# College of *Science, Engineering and Technology*



Technology Programs

FIND YOUR PURPOSE

GRAND CANYON  
UNIVERSITY®

PRIVATE. CHRISTIAN. AFFORDABLE.

# College *of* Science, Engineering *and* Technology

In the rapidly developing and competitive field of STEM, the College of Science, Engineering and Technology creates a challenging and engaging learning environment through robust collaboration and partnership with STEM-related industries.

Our mission is to produce empowered graduates instilled with enhanced skills, hands-on experience and Christian convictions to make a difference in the world.

**VISIT [GCU.EDU/CSET](http://GCU.EDU/CSET)**

## WHAT MAKES GCU'S TECHNOLOGY PROGRAMS DIFFERENT

GCU's technology programs are set apart from other universities because of our unique ability to provide students opportunities to work with cutting edge technology and push their knowledge beyond the curriculum.

### **Additional benefits include:**

- ▶ Industry-driven curriculum aligned with GCU's STEM guiding principles to ensure students grow in soft skills
- ▶ Technology Club
- ▶ Hands-on and project-based learning environments with industry-relevant technology platforms
- ▶ Faculty dedicated to teaching and learning
- ▶ Christian worldview integrated into core technology courses
- ▶ Research and design programs







# HANDS-ON



## EXPERIENCE

### **Canyon Ventures**

Established in August 2019, Canyon Ventures is GCU's one-of-a-kind organization that brings together scholars, entrepreneurs, investors, revenue growth experts and mentors to create a collaborative business environment. The space includes local businesses who have committed to give valuable career opportunities to GCU students. Some businesses are even started by students, and all of the organizations provide Lopes with industry-caliber experience.

### **Cyber Center of Excellence**

The CCE provides the hands-on learning environment that combines apprenticeship with real-world experiences to develop competence and knowledge. Based on a “hackers with halos” code of conduct combined with technical controls, the CCE is a place where participants can think like a hacker, but without breaking laws or compromising fundamental ethical principles.

### **Virtual/Augmented Reality Research Labs**

These research and design labs provide students access to advanced virtual and augmented reality equipment such as the Oculus Quest, Microsoft HoloLens, and HP Vive Pro where they can explore their creativity by implementing complex computer science and development concepts. This facility is only available to students who wish to participate in research and design projects which are available beginning your freshman year.







# REAL-WORLD PREPARATION for Career Success

*Our passionate instructors specialize in more than just lecturing — they engage students in active learning and career training.*

## **Our industry-focused program incorporates:**

- ▶ Industry-led curriculum adaptive to the ever-changing field
- ▶ Access to industry-standard virtual equipment through LopesCloud
- ▶ Business mindset and entrepreneurial approach
- ▶ Instructors who act as a project or worksite manager
- ▶ Collaborative teamwork while applying project-management principles
- ▶ Expanded teaching beyond just lectures with emphasis on demonstrations
- ▶ Open classroom dialogue to practice articulating different viewpoints on faith-science relationships



**“Our engineering and technology degree programs provide a challenging, inquiry-based environment fostering creativity, innovation and collaboration. Through our industry partnerships, we ensure our students receive opportunities to solve real-world problems, innovate, think entrepreneurially, intern and engage with industry experts.”**

— Dr. Mark Wooden, *Dean of the College of Science, Engineering and Technology*



```
mirror_mod.use_y = True
mirror_mod.use_z = False
elif operation == "MIRROR_Z":
    mirror_mod.use_x = False
    mirror_mod.use_y = False
    mirror_mod.use_z = True

mirror_ob.select = 1
modifier_ob.select = 1
bpy.context.scene.objects.active = modifier_ob
print("please select exactly two objects")

except:
    print("please select exactly two objects")

OPERATOR CLASSES
```

# WHY MAJOR IN TECHNOLOGY

## AT GCU?

Our College of Science, Engineering and Technology is a school for leading-edge, STEM-centered education that houses our fast-growing, industry-oriented technology programs. Our comprehensive technology programs include computer science, software development, information technology, software engineering and cybersecurity.

- ▶ **ABET:** GCU recently received ABET accreditation for our computer science programs. ABET accreditation provides assurance that a college or university program meets the quality standards of the profession for which that program prepares graduates.
- ▶ **Programs and No Legacy Curriculum:** Our industry-driven curriculum co-designed with industry professionals puts our students at the forefront of the technology sphere.
- ▶ **Student Intellectual Property:** We believe in providing students with the opportunity to create intellectual property and have project ownership over their designs. Intellectual property means creations belong to the student, not the university, and can showcase a graduate's innovative and creative skills to a future employer.

### Exposure to Software and Technology Development

Our program goes in-depth regarding how software works so students can not only use the software that's already in the industry, but can also create new and original software themselves. Additionally, coding is embedded into every program to create a functional skill set that will be applied later in industry. GCU uses current industry professionals and a quarterly advisory board to determine current areas of knowledge that parallel career opportunities. Students learn a variety of high-level programming languages including Python, Java, C#, PHP/MySQL, PostgreSQL and T-SQL.

Throughout the Software Engineering program, students learn various current and dynamic programming languages and dynamic web application frameworks including the Spring Framework. These courses focus on fully understanding the SDLC, various methodologies to employ the SDLC and allow students to develop fundamental skills in Embedded Systems, Machine Learning, and Artificial Intelligence by utilizing the development tools of robots, IoT devices, microcontrollers, and FPGA boards.



# IS TECHNOLOGY

## FOR ME?

Students can start exploring their vocation by simply identifying what they enjoy doing. Ask questions like, “What motivates me?” or “How can I turn my faith into action?”

Among various resources and helpful instructors, the Academic and Career Excellence (ACE) Center can further help students discover which technology program to pursue. Students will weigh in on personality traits, skills and interests. Students will consider factors like attention to detail, strong work ethic, in-depth problem-solving skills, the ability to be proactive and entrepreneurial skills.

### Students enrolled in CSET programs learn by:

- ▶ Completing coursework in mathematics and the physical sciences
- ▶ Creating apps
- ▶ Designing capstone projects with industry mentorships
- ▶ Developing software
- ▶ Participating in programming competitions
- ▶ Programming IoT devices
- ▶ Solving problems
- ▶ Thinking outside the box
- ▶ Working with a team
- ▶ Working with code
- ▶ Working with networks, servers and databases





## ACADEMIC MINOR DEGREE PROGRAMS

Minor degrees are a great way to supplement your major with specialized knowledge in your preferred area of technology. A minor within the College of Science, Engineering and Technology provides a quick way to gain additional CSET concepts and tools as a budding CSET professional in cybersecurity, programming, IT management and more.

➤ FOR A FULL LIST OF MINORS,  
VISIT [GCU.EDU/MINORS](https://www.gcu.edu/minors)

# TECHNOLOGY PROGRAMS

## COMPUTER SCIENCE

Computer Science is the study of computers and computational systems focusing on topics including digital logic and design, algorithm analysis and big data. The computer science program offers emphasis in business entrepreneurship, game and simulation development and big data analytics that provide opportunities to build compilers, learn AI by programming robots and develop virtual and augmented reality using development tools such as Unity, R, Python, CUDA and IoT devices.

*GCU's computer science program is accredited by the ABET Computing Accreditation Commission. Visit [gcu.edu/ABET](https://www.gcu.edu/ABET) to learn more.*

## CYBERSECURITY

This program focuses on defending digital spaces, computer environments, networks and sensitive information from malicious software developers and hackers. It teaches and assesses competency in all aspects of defensive and offensive cybersecurity, cyber law and cyber ethics by providing students with skills associated with proactive cyber techniques or "Red Team Security" (professionals who are experts in attacking systems and breaking into defenses to test network effectiveness).

## INFORMATION TECHNOLOGY

This program provides students with the practical experience associated with the care for both an organization's IT infrastructure (such as networks, servers, databases, etc.) and the people who utilize it. This program also offers an emphasis in cybersecurity that adds an additional focus on a defensive cybersecurity or "Blue Team Security" mindset.

The Bachelor of Science in Information Technology with an Emphasis in Cybersecurity is designed to provide students a foundational skill set in Information Technology, along with a defensive cybersecurity mindset. This is commonly referred to in the industry as "Blue Team Security", because you are reactive or defensive in technique. GCU's Bachelor of Science in Cybersecurity provides students with skills to be proactive in their cyber techniques. This is an offensive cybersecurity program preparing students for "Red Team Security" activities. Students can also minor in cybersecurity, which provides foundational information with technology skills in programming, system administration and computer networks.

The term "hacking" is viewed as an illegal, non-Christian activity. At GCU, we teach students white-hat hacking practices, or "ethical hacking." This is the term used in the industry for cybersecurity professionals who use their abilities for the right reasons through hacking to help individuals and businesses solve cyber technology issues and catch cyber criminals from causing harm. We refer to these students as "Hackers with Halos."

A class in our cybersecurity program, "Cybersecurity and Ethical Hacking," allows students to understand how a Christian heritage and ethical hacking practices are highly coveted in the industry of cybersecurity.

The National Security Agency and the Department of Homeland Security have designated Grand Canyon University's BS in IT with an Emphasis in Cybersecurity program with a National Center of Academic Excellence in Cyber Defense Education (CAE-CDE) recognition.

## SOFTWARE DEVELOPMENT

This program covers the fundamentals of object-oriented design, problem solving, and algorithm analysis by building off of programming tools, such as Java and C#, and web application frameworks, such as the Spring Framework and Enterprise Java. Students employ test-driven programming methodologies to develop secure, high-performance, database-driven applications.

## SOFTWARE ENGINEERING

Throughout this program, students learn various current and dynamic programming languages including Java, Python, C++ and dynamic web application frameworks including the Spring Framework. This program focuses on fully understanding the software development lifecycle (SDLC) and allows students to develop fundamental skills in Embedded Systems, Machine Learning, and Artificial Intelligence by utilizing the development tools of robots, IoT devices, microcontrollers, and FPGA boards.

## APPLIED TECHNOLOGY

This program is geared to be very transfer friendly and provides students who have pre-existing credits from a community college, the military, or from another university a simpler path to complete an educational journey in technology. Students work through problem-solving scenarios utilizing technology associated with hands-on technical experience in topics such as networking, security, programming, database systems, IT process management, and general soft skills focus throughout the program.



# WHICH TECHNOLOGY PROGRAM

## IS RIGHT FOR YOU?

### **CYBERSECURITY** ▶ *INNOVATIVE, PROBLEM-SOLVING MINDSET*

Do you have strong analytical skills, adaptability and self-confidence?  
Are you interested in helping others and protecting sensitive data?

### **SOFTWARE DEVELOPMENT** ▶ *IMPLEMENT, HANDS-ON MINDSET*

Are you good at following technical guidelines, engaging in lengthy trial-and-error processes with unpredictable outcomes? Do you have good quantitative reasoning skills?

### **SOFTWARE ENGINEERING** ▶ *INVENTIVE, SYSTEMATIC MINDSET*

Do you like to find innovative solutions to complex problems?  
Do you like having your ideas impact people in a positive way?

### **COMPUTER SCIENCE** ▶ *INVENT, RESEARCH-AND-DEVELOPMENT MINDSET*

Do you enjoy solving math problems, learning theoretical principles behind technology and designing solutions that integrate scientific concepts?

### **INFORMATION TECHNOLOGY** ▶ *INTEGRATE, MAKING-THINGS-WORK MINDSET*

Do you like working behind the scenes? Are you inspired by continuously evolving technologies and interested in applying new innovations toward the greater good?

### **APPLIED TECHNOLOGY** ▶ *INSPIRED, TECHNICAL MINDSET*

Do you have a higher education or military background in technology?  
Are you looking to finalize your skills to take the next step towards your career in technology?









WHAT IS STUDYING



# TECHNOLOGY LIKE AT A CHRISTIAN UNIVERSITY?

Our Christian worldview serves as the starting point for learning. We seek to cultivate career-ready graduates who possess a servant's heart and industry-identified skills such as collaboration, ethical character, moral truth, social awareness and Christian convictions. Within these skills, students are taught to use technology for the betterment of others and to bring about good.

## **Coexistence of Faith and Scientific Exploration**

Our learning environment encourages science-faith inquiry that's open to the analysis of scientific and theological interpretations. Our Christian beliefs provide a moral and ethical guide in our search, leading us to celebrate scientific discoveries. We respect and welcome different perspectives and believe in intellectual discourse.

## **WHAT MAKES STUDYING TECHNOLOGY FROM A FAITH PERSPECTIVE AT GCU UNIQUE?**

### *The Love of Christ Compels Us*

The pursuit of holistic ministry through third-world applications also helps strengthen servant leadership. At GCU, to become career-ready means to carry one's unique mission under heaven, while serving the advancement of the world and economy.

## **SACRED VOCATION**

John 14:12 states: "Very truly I tell you, whoever believes in me will do the works I have been doing, and they will do even greater things than these, because I am going to the Father." Many of our students are answering the call to aspire to do even greater things.

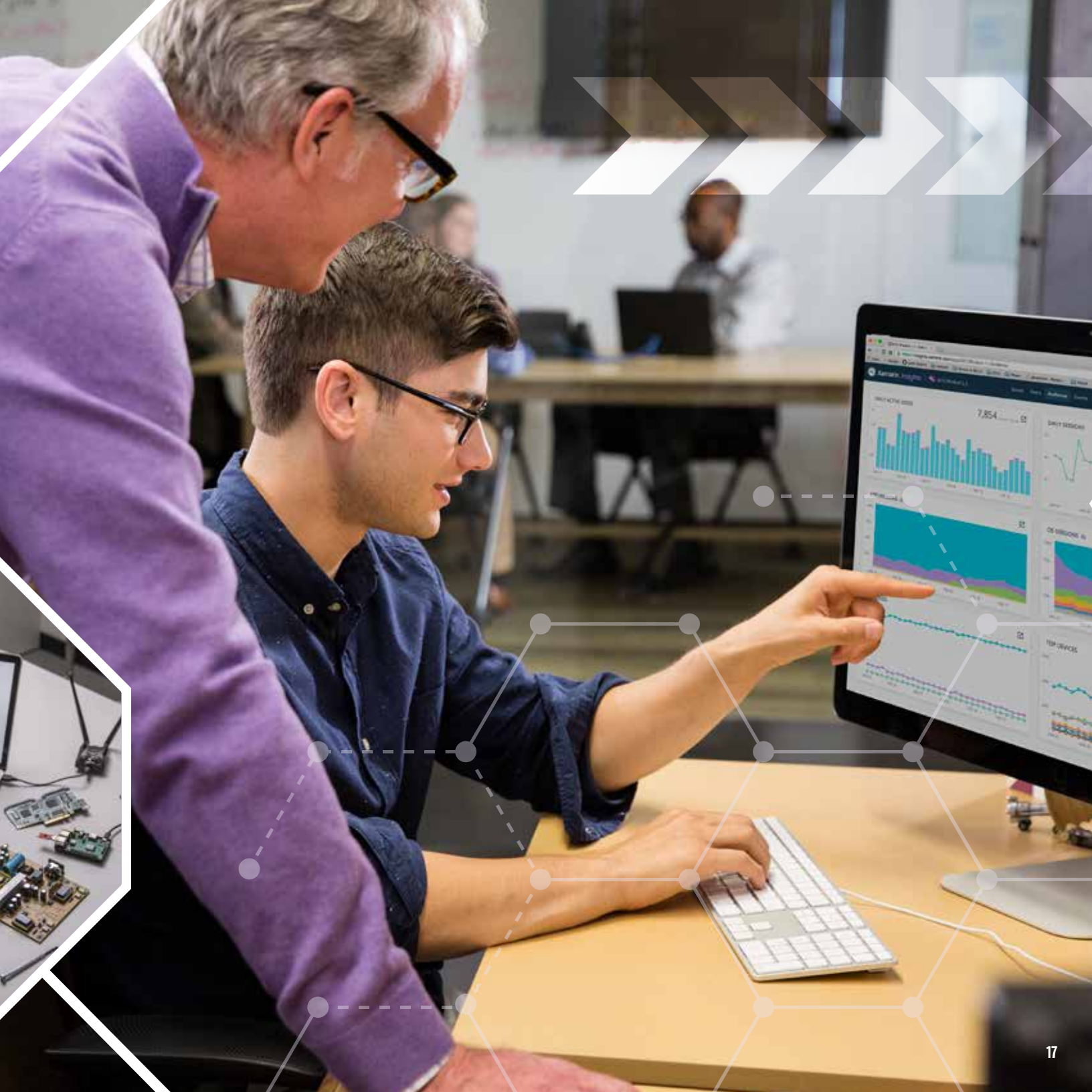
Some took it upon themselves to re-tell the stories of the Bible and demonstrate that while the lambskin of the scribes has been replaced with virtual reality technology and computer code, the message of truth and love for fellow humans is more relevant than ever.

Other students lend their skills to help those who cannot help themselves: missing and abducted children. They pursue technology and knowledge beyond intellectual curiosity with a simple yet profound purpose: to create a tool to help us all love our neighbor.

# Industry-Oriented Curriculum

GCU's program is unique in that curriculum is developed by experts and representatives from major corporations and small consulting companies. GCU assembled a group of science, technology and engineering leaders, along with GCU executives and STEM experts in the Phoenix area. These advisory board members were selected for their expertise and genuine excitement for student success. Our internships and capstone mentorships are also generated from this setting.







# RESEARCH PROJECT

## OPPORTUNITIES

Alongside faculty, students have opportunities to participate in research projects or initiatives like the Research and Design Program (RDP). It's professional experience like this that gives students a unique competitive edge in technology professions. Our Center for Innovation in Research and Teaching (CIRT) provides guidance on research topics, methodologies and avenues for publication and presentation. CIRT also secures and provides grants for priority research projects.



## ➤ AWS DeepRacer Project

Students participate in the Amazon AWS DeepRacer League, which is the world's first global autonomous racing league, driven by machine learning. Students are able to compete monthly for prizes all while accessing the fastest way to learn machine learning. The AWS DeepRacer League brings developers from all over the world together through this Machine Learning (ML) competition. With hands-on training, students build reinforcement learning (RL) models using the AWS DeepRacer device and 3D virtual racing simulator.

## ➤ The Virtual Reality Bible Project

Dr. Isac Artzi, the College of Science, Engineering and Technology's Computer Science lead, created the Virtual Reality Bible Project to bring our stories to life in a new way. Seven groups of students are now programming Biblical stories, such as the parting of the Red Sea and Noah's Ark and integrating GCU's Christian worldview with computer science concepts in a unique way.

## ➤ NCMEC Data Analytics

"As a computer science major, I was introduced to R, a programming language, and data analytics software, which allowed me to form the knowledge basis I needed to create my app—the National Council of Missing and Exploited Children Data Analysis Tool (NCMEC - DAT). The app takes two sets of data from the National Center for Missing and Exploited Children—a missing persons set and an attempted kidnapping set—and displays data inside a filterable map based on characteristics such as child gender, age, race and location. This way, law enforcement doesn't have to sift through thousands of rows of data. Instead, they use filters to narrow down the data and clearly display it on a map and download the data set."

— Connor Segneri, Alumni 2018, Bachelor of Science in Computer Science with an Emphasis in Big Data Analytics

## ➤ Private Cloud Computing Project

Professor Reha challenged his software development students to design and build a fully functioning, low-cost, private cloud platform using a cluster of Raspberry PIs. The students developed the platform on a cluster of four Raspberry PIs, which was then expanded to a cluster of 25. The cloud platform supports and runs a wide range of current web application stacks and databases, all being managed by a web-based administration application written in a JAVA framework the students learned as a part of their degree program.

## ➤ Computational A.I./Machine Learning Neuroscience & Robotics Project

Professor Jevon Jackson challenges students to develop and employ algorithms to solve complex problems and make machines come to life. Students learn to teach a computer to calculate/predict the most efficient and likely outcome and then act on it (making decisions and visualizing them for further analysis and understanding). This research lab involves the use of Machine Learning types (reinforcement learning, deep learning, neural networks, FPGA development, embedded systems and much more). Solutions are deployed for various devices such as cars, robots and other types of mechanical devices, robots, etc.

# DID YOU KNOW?

Many of our labs are completely devoted to technology and are all available for students to experience hands-on learning using advanced technologies and tools for real-world projects.

Unlike many other universities, students can access these labs from day one as freshmen to develop their skills and expand their ideas.







## ON-CAMPUS STATE-OF-THE-ART TECHNOLOGY FACILITIES

GCU now has two buildings dedicated to STEM learning to accommodate the growing number of students studying these trades. Technology students have access to a virtual environment called LopesCloud where students learn hands-on by logging into a server and working via real-world scenarios. By using these virtual classrooms, students are able to reset scenarios as necessary to better their learning experience through repetition and trial and error.

## INNOVATIVE LABS, ONGOING PROJECT-BASED LEARNING AND INTEGRATED LECTURE LAB

Our technology program offers students a rare opportunity to dive right in and get industry-relevant experience doing things technologists are doing in the field every day.

- ▶ Project-based learning is the process in which students are able to take their ideas and build them in to real-world solutions. It is a long-term commitment among faculty and students where guided narrow research, collaboration and oversight turn into finished products.
- ▶ Technology students also benefit from the integration of lecture and lab, giving teachers more control over the breakout of the class.

## CYBERSECURITY TRAINING

The Cybersecurity Center of Excellence is a hands-on training environment set in place to develop a well-trained workforce versed in the continuous improvement process for cybersecurity using self-paced training, organic mentoring and a real-world experience. It hosts hands-on exercises for everyone— from beginners to tenured professionals.





# GCU

# ESPORTS

Esports is one of the fastest growing industries in the world, and GCU is taking notice! Our Esports program is the premier gaming organization on campus. We have over 100 collegiate players participating across 20 teams\*. GCU Esports supports a community that fosters competitive spirit while encouraging social entertainment. Our program has recently been recognized with media coverage, including ESPN!

\*Spring 2020





**“I was afraid of making new friends when I first came to college. But Esports club people were really friendly and very nice. I became friends with a lot of people. Leadership and teamwork was achieved with the teams and stronger relationship with my teammates after tournament matches.”**

— Daesik 'David' Cho, *Class of 2022, Computer Programming*







# BEYOND THE CLASSROOM: *Design, Create, Build*

## **The Technology Club**

Information X Technology Club (IXT) provides an environment for like-minded people to pursue their interests and share their passions by engaging with other students in projects. Out of the diverse world of engineers, programmers, hackers, data scientists and other pursuits, the club unites students in a common endeavor: to be creative with technology. It meets twice a week and hosts instructors onsite to provide support to students. Groups work on personal projects, hacking, coding, web design and more.

**“I knew I wanted to major in cybersecurity and was looking at a Christian college on the east coast when I heard about GCU’s Discover Trip. Right when I got to GCU, I knew I wanted to attend. Joining the IxT Club changed everything for me in my college experience — from being involved to getting real-world experience and skyrocketing my knowledge around cybersecurity. One of my favorite parts of the club is all the outreach, like helping with Girls Who Code. I really like helping schools and sharing any knowledge I have. Now that I’m president of IxT, I want to do a lot more outreach next year at GCU.”**

— Trevor Baines, *Bachelor of Science in Information Technology with an emphasis in Cybersecurity, and Technology Club President*

```
100%" cellspacing="" cel  
="changecontent(this)">  
ome to Computer Science?<  
gt?</option>  
logy</option>  
  
"35" wrap="virtual"></tex
```



# TECHNOLOGY ▶ *Top 5's*

- ▶ **Real-world, hands-on Experience** *pg. 4–5*
- ▶ **Cybersecurity Center of Excellence** *pg. 4*
- ▶ **Undergraduate Research Projects** *pg. 18–19*
- ▶ **GCU Esports** *pg. 22–23*
- ▶ **Technology Club** *pg. 25*



# NEXT *steps:*

- 1 ▶ Apply for free at [gcu.edu/ApplyNow](https://gcu.edu/ApplyNow)
- 2 ▶ Upload your transcripts and submit your test scores
- 3 ▶ Upon acceptance, visit campus  
(all-expenses paid\* programs available)
- 4 ▶ Register for courses and pay the registration deposit



*To learn more about Grand Canyon University, undergraduate programs offered on campus, available scholarships and more, contact an admissions counselor.*

**855-428-7884**  
**[gcu.edu/CampusAdmissions](https://www.gcu.edu/CampusAdmissions)**

\*Restrictions for travel reimbursement may apply.

Club sports are not regulated by the National Collegiate Athletic Association (NCAA), and do not have varsity status at the intercollegiate athletic level. However, club sports are organized and administered by their respective national sport governing body. Grand Canyon University is accredited by the Higher Learning Commission ([hlcommission.org](https://www.hlcommission.org)), an institutional accreditation agency recognized by the U.S. Department of Education. Please note, not all GCU programs are available in all states and in all learning modalities. Program availability is contingent on student enrollment. Pre-licensure nursing students who begin or resume attendance in Fall 2020 and beyond will be ineligible to utilize most GCU institutional aid/scholarships for tuition and fees once accepted into the clinical portion of the program. Important policy information is available in the University Policy Handbook at <https://www.gcu.edu/academics/academic-policies.php>. The information printed in this material is accurate as of JANUARY 2022. For the most up-to-date information about admission requirements, tuition, scholarships and more, visit [gcu.edu](https://www.gcu.edu). ©2022 Grand Canyon University 22GTR0006